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THE COSTS OF FEEDING TO HEAVIER WEIGHTS

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Record feed grain production in 1967 and the large number of animals available for feeding point to another year of large red meat supplies and potential downward pressure on prices of slaughter livestock. When feed grain supplies are large and prices are relatively low, livestock feeders in the past have tended to extend the normal feeding period and market animals at heavier weights. Such action in 1968 may materially lower their rate of return, as well as cause some industry wide problems.

Feed is one of the major costs in livestock feeding. A feeder's profit is determined to a large extent by his ability to convert feed into meat efficiently. The cheapest weight gains usually are made when animals are young and in their fastest stage of growth. Feeding efficiency generally declines as animals mature and gain weight since more energy is required for body maintenance. Consequently, more feed is needed for each pound of gain, and the cost of gain rises.

The following data illustrate changes in feed conversion efficiency for livestock from initial feeder weights to normal slaughter finish. Although detailed information on feeding efficiency of livestock kept beyond normal finish is limited, the data available show that efficiency continues to decline as weights increase, often at an accelerated rate.

The decrease in feed conversion efficiency for cattle, lambs and hogs as they gain weight is pointed out in the National Research Council's Reports on Nutrient Requirements of Domestic Animals (5). (Table 1) These reports show the feed conversion ratio for 600 pound yearling feeder steers is about 6.7 to 1 as compared to a ratio of 8.3 to 1 at 800 pounds and 11.2 at 1,100 pounds. In other words, two-thirds more feed is required to put on a pound of gain as the animal nears 1,100 pounds than was required at 600 pounds.

When cattle are fed to weights in excess of 1,100 pounds, the conversion efficiency ratio declines even more sharply. For example, in a University of Illinois study of steer feeding, only 6 pounds of feed were required per pound of gain during the first 28 days on feed, compared with over 20 pounds of feed per pound of gain the last 28 days (6). This was for yearling steers fed 308 days and marketed at an average weight of 1,442 pounds.

The American National Cattlemen's Association has published a summary of data from various university studies and information from individual cattle feeders throughout the U.S. which show similar results (1). Generally, feed costs per pound of gain in cattle more than triple over a year's feeding period. Furthermore, costs increase at an increasing rate as cattle are fed to heavier weights. (Figure 1) As the animals pass desirable market weight, the cost of gain becomes critically high. This clearly shows the profitability of marketing cattle as soon as they reach the desired grade.

Feed conversion ratios for finishing lambs show the same basic trends. (Table 1) According to the National Research Council, the quantity of feed required per pound of gain rises from 7.7 pounds for 60 pound feeder lambs to 9.7 pounds for 100 pound lambs (5). This is a 26 percent increase. A study at the University of Kentucky indicates that feed requirements per pound of gain continue to increase as lamb weights rise above 100 pounds (3).

Although hogs convert feed more efficiently than either cattle or lambs, the changes in feed conversion ratios follow similar patterns. The National Research Council data indicate that the conversion ratio increases about 45 percent in the growing and fattening of 50 pound feeder pigs to 225 pound slaughter hogs. (Table 1) About 2.8 pounds of feed were required per pound of gain from 50 to 75 pounds,

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Table 1.--Daily Feed Requirement and Feed Conversion Ratio for Cattle, Lambs and Hogs*

Body Weight (Lbs.)	Daily Feed Requirement (Lbs.)	Average Daily Gain (Lbs.)	Pounds of Feed Per Pound of Gain (Lbs.)
	Finishing Yearling Cattle		
600	17.5	2.6	6.7
800	22.3	2.7	8.3
1,000	25.8	2.6	9.9
1,100	25.8	2.3	11.2
	Finishing Lambs		
60	2.7	0.35	7.7
70	3.1	.40	7.8
80	3.4	.45	7.6
90	3.7	.45	8.2
100	3.9	.40	9.7
	Finishing Hogs		
50-75	3.7	1.3	2.8
75-125	5.2	1.6	3.3
125-175	6.7	1.7	3.9
175-225	7.8	1.9	4.1

*Source: National Academy of Sciences, National Research Council. "Nutrient Requirements of Domestic Animals", Reports of the Committee on Animal Nutrition, Agricultural Board, Publications 1137, 1192 and 1193, 1964.

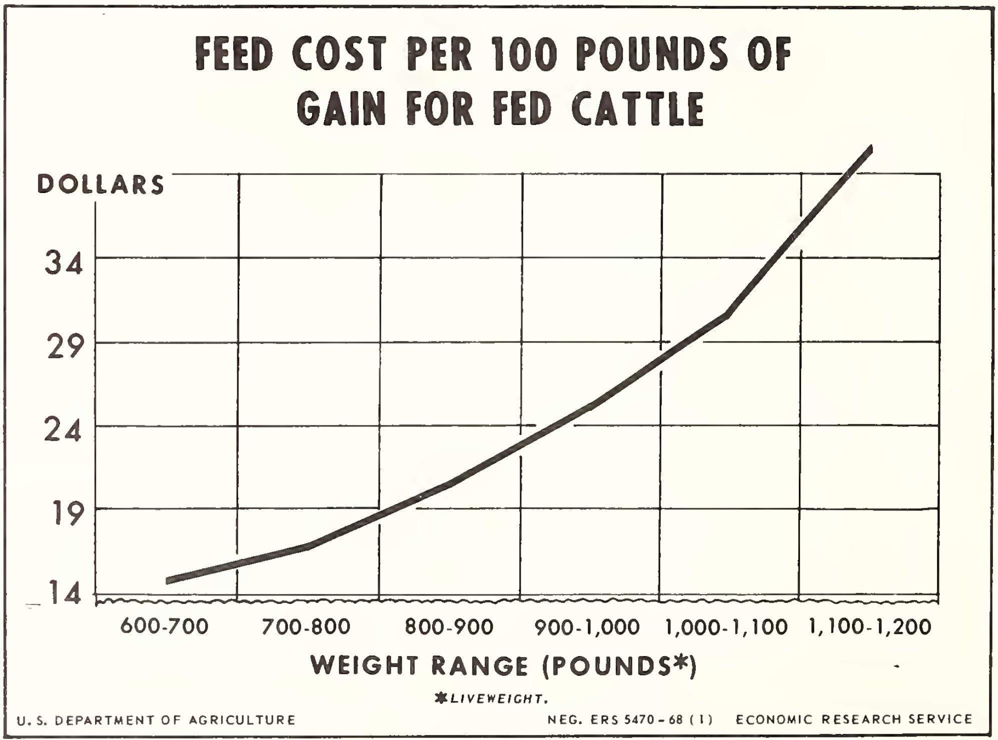

Figure 1

3.9 pounds from 125-175 pounds, and 4.1 pounds of feed per pound of gain from 175-225 pounds. A study at North Dakota State University showed similar conversion rates up to 225 pounds, with further increases in feed requirements above this weight (4). (Figure 2)

Individual livestock feeders may experience different conversion rates, and results may vary between different pens of livestock. However, commercial feedlots which have kept records on feed requirements at varying weights tend to confirm the foregoing illustrations. It is clear that feeding to heavy weights results in substantially increased costs per pound of gain.

In addition to incurring extra costs in feeding to heavy weights, other economic factors come into play and further reduce returns to feeders and to the industry. Of major importance is the depressing effect on prices of the increased tonnage of meat produced and the price discounts on heavyweight carcasses that develop when average slaughter weights increase.

The demand for meat in total has grown substantially in recent years. However, the growth in demand has not been consistent for all meats. Per capita beef consumption increased from 81 pounds in 1959 to over 106 pounds in 1967, with fed beef consumption increasing from 45 pounds to 71 pounds. Per capita pork consumption, on the other hand, declined from almost 68 pounds in 1959 to 58 pounds in 1966, before increasing to nearly 64 pounds in 1967. Lamb and mutton consumption rose from 4.8 pounds in 1959 to 5.2 pounds in 1962 but declined to less than 4 pounds in 1967.

Because of the differing demands for each of the red meats, supply changes affect prices of each differently. With the growth in demand for beef, moderate increases in beef supplies can be utilized without serious price consequences. However, with a relatively less favorable demand situation for pork, larger supplies tend to depress prices more.

Besides the price effects of adding to the total supply of meat, feeding to heavy weights quickly causes an over supply and sharply lower prices of heavy weight carcasses, especially of beef and lamb. There is only a limited market for excessively heavy, highly finished carcasses. When the relative supply of heavy carcasses exceeds the limited demand, the total supply can be moved only at lower prices.

The sharp price effect of changes in fed beef supplies and changes in marketing weights was brought out in a recent USDA analysis: a 1 pound increase in the quarterly per capita supply of fed beef would result in a price decline of more than $1.00 per 100 pounds in Choice steers at Chicago; a 10 pound rise in the average liveweight of steers at 7 markets would result in a price drop of around 50 cents per 100 pounds.

One reason for price weakness with increases in average live weight is illustrated in a University of Illinois study (6). Two similar groups of yearling steers were placed on full feed--one group was slaughtered at an average weight of 1,114 pounds and the other at 1,442 pounds. The yield of saleable meat as a percentage of carcass weight was reduced nearly 12 percent in animals fed to heavier weights. The additional 328 pounds per steer added only 253 pounds of carcass. The net result, however, was only 56 additional pounds of saleable meat--about one-fifth of the total carcass weight increase; the rest was mostly added waste. Thickness of fat over the ribeye increased from 0.6 inches to 1.43 inches. The actual retail value was reduced more than $4 per 100 pounds on a liveweight basis, despite a 3-percent higher dressing percentage for the heavier cattle.

In late 1966 and early 1967, when slaughter steers at 7 markets averaged nearly 1,150 pounds and steer and heifer beef production was about 11 percent above year-earlier levels, 1,100-1,300 pound Choice steers at Chicago sold 50-75 cents per 100 pounds below 900-1,100 pound steers. (Figure 3) The situation

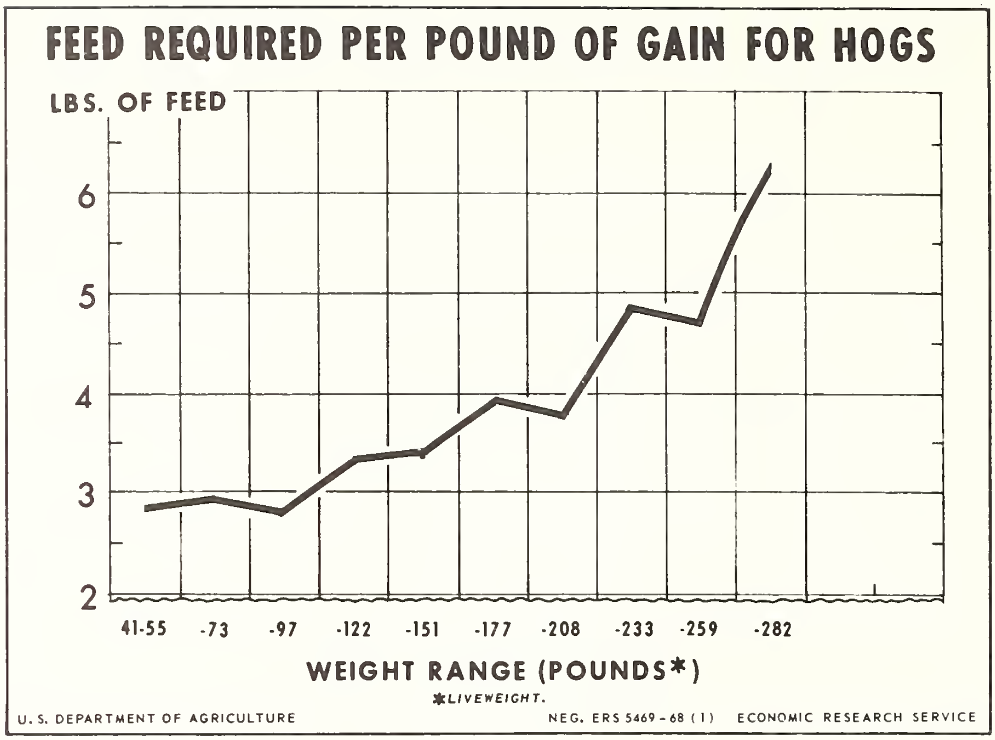

Figure 2

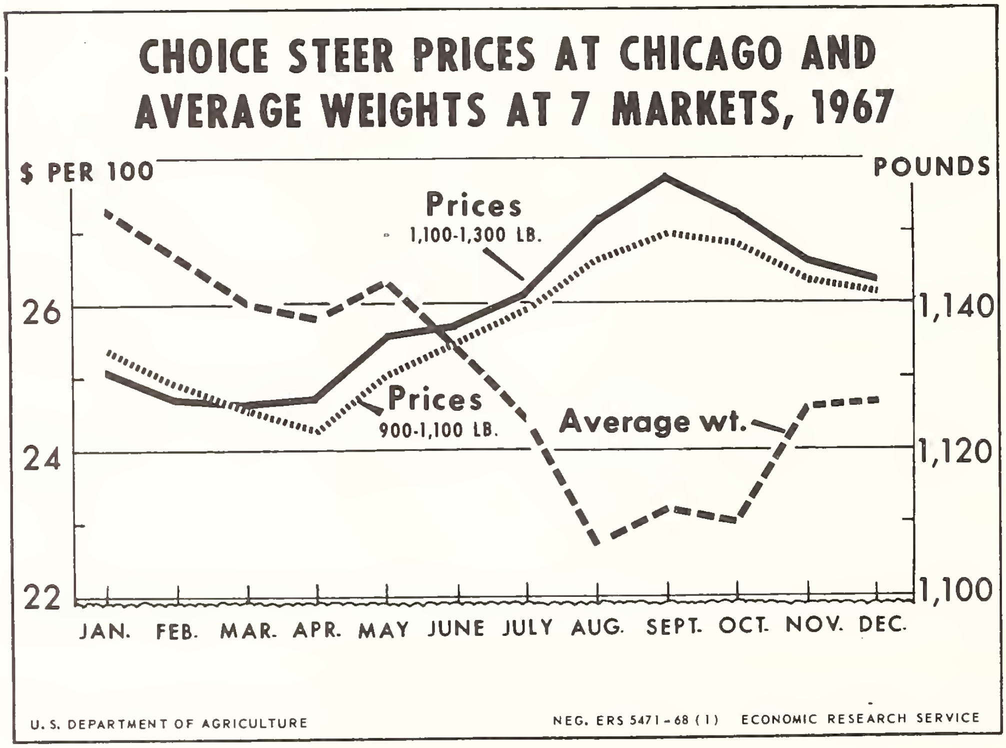

Figure 3

changed during the year. By late summer and early fall of 1967, steer and heifer beef production was only slightly above a year earlier. Furthermore, average weights had dropped to about 1,110 pounds, and 1,100-1,300 pound Choice steers sold at 75 cents to $1 per 100 pounds above the lighter weight group. Weights increased during the rest of the year, exceeding 1,130 pounds at 7 markets in late December.

Average slaughter weights of hogs influence pork production the same way that cattle weights affect beef output. Also, increases in the amount of fat result in decreases in the percentage of saleable meat and value when hogs are held to heavier weights. According to estimates by USDA's Consumer and Marketing Service, holding hogs from 200 to 250 pounds will result in an increase in fatness equivalent to one grade or more. This will reduce the percentage yield of the four major lean cuts by 3 percent of the carcass weight. At current prices, the heavier hogs would be worth at least $1 per 100 pounds less to the packer due to the reduced cutting yields and lower prices for heavier cuts.

Price spreads between various weights and grades of slaughter hogs are affected by the relative supply of heavy slaughter hogs in much the same manner as price differences between weights and grades of cattle. Weights of slaughter hogs follow a seasonal pattern, generally starting from a relatively high level in January, dropping through the remainder of the winter, rising in the spring, dropping again from late spring through mid-summer, then rising again in the fall. (Figure 4) For example, as average slaughter weights decline, the price spread narrows between U.S. No. 1 & 2 (200-220 pound barrows and gilts) and U.S. No. 2 & 3 (270-300 pounds). When average weights increase, the price spread between these weights and grades widens.

Lamb feeders sometimes hold lambs to excessive weights, and in so doing adversely affect the entire lamb market. The supply-demand balance between heavy and lightweight lambs can be just as easily tipped as in the beef market. Substantial price discounts on heavy lambs are not uncommon, particularly in the winter months when the bulk of the lamb supply is from feedlots. Judging from the price spreads reported between 35-45 pound and 55-65 pound carcasses at Chicago, discounts on live lambs weighing over 115 pounds have exceeded $4 per 100 pounds in recent years. Figure 5 shows price movements and spreads between 35-45 pound and 55-65 pound Choice lamb carcasses at Chicago and average live weight of sheep and lambs slaughtered under Federal Inspection in 1967. These data illustrate that as the relative supply of 55-65 pound carcasses exceeds a given level, buyers begin discounting heavy lambs.

An ERS study shows a substantial difference in the value of medium weight lamb carcasses compared with heavy weight carcasses (2). For example, the study indicates that in recent years the retail value per pound was reduced as much as 9 percent when live weights increased from 90 to 120 pounds.

This year promises to be one of continuing large red meat supplies. Although lamb and veal production probable will be down somewhat, fed beef output likely will be near last year's record output; and pork supplies likely will equal or exceed 1967 production. Also, the record large corn crop and substantially lower corn prices may tempt some producers to feed to heavier than usual weights and further increase production.

Livestock producers can benefit individually and as a group by giving careful consideration to costs and the advantages of moving animals to market at desirable market weights. Any action taken to ease the pressure on livestock prices that would result from larger supplies--and from an over supply of unusually heavy animals will be beneficial. Such action will tend to keep total meat production in line with effective demand and strengthen livestock prices throughout the industry. Producers can reduce their own feeding costs as well as improve their rate of returns by exercising judgment in feeding livestock for market.

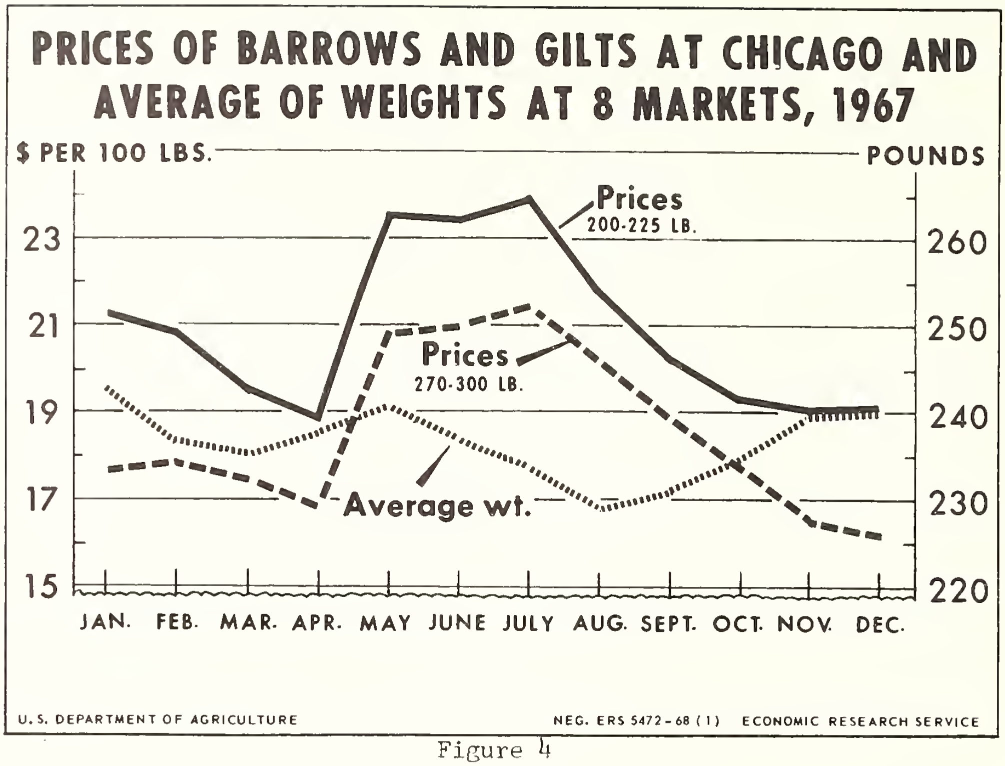

Figure 4

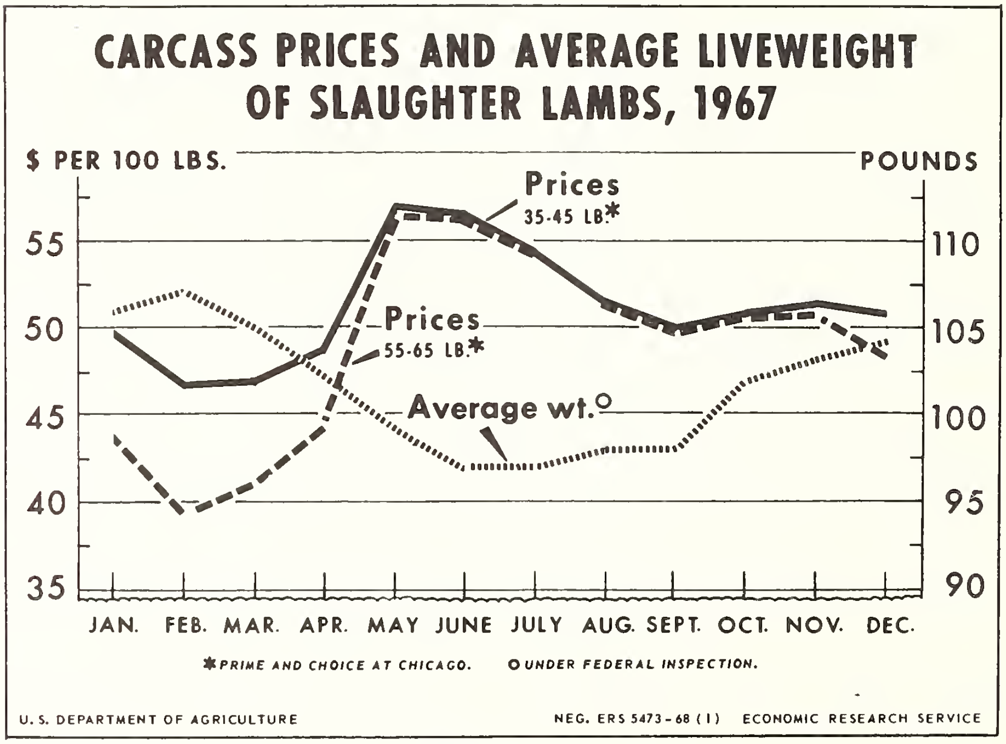

Figure 5

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HEAVY LAMB CARCASSES--THEIR RETAIL VALUE

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The value of lamb--or any livestock--to both packers and farmers is largely determined by the value of the retail cuts obtained.

Using retail cutout weights for a sample of 542 Choice and Prime lambs slaughtered in a research project at Texas A&M[1], ERS determined the retail value[2] of the carcasses under prevailing prices each week for 3 years, starting in July, 1964 by revaluing the carcasses in line with current retail prices each week. These total retail values were then converted to a retail value-per-pound basis. Average values per pound were then computed for all carcasses falling into the 3 weight groups customarily used for wholesale price reporting. Of the 542 carcasses, 235 fell into the 35-45 pound weight group, an additional 235 fell into the 45-55 pound weight group and 72 fell into the 55 pound and over weight group (73.5 pound maximum).

The average retail value per pound during each of the first 15 weeks of the 1965, 1966 and 1967 fed lamb marketing seasons is shown in Table 1. In these 3 January through April periods, the average retail value per pound of 35-45 pound carcasses ranged from 1.4 to 1.9 cents per pound above that of the 45-55 pound group. During the same periods, the average retail value of the 45-55 pound carcasses ranged from 5.5 to 6.6 cents per pound above that of the 55 pound and over group.

While the average retail values portray a rather concise picture over time, the distribution of the value of the carcasses is of equal or greater importance. Retail lamb prices peaked during the 9th week of 1966, the week of February 28 through March 5 (noted by asterisks in table 1). The distribution of retail values for all 542 carcasses during this week is shown in figure 1. Note that the retail value of carcasses weighing 35 to 45 pounds ranged from 69.3 cents to 88.3 cents per pound. Similarly, carcasses weighing 45 to 55 pounds ranged from 64 cents to 88 cents per pound in retail value. Finally, the retail value of carcasses weighing 55 to 73 pounds ranged from 62.5 cents to 82 cents per pound. The distribution points out that some heavier carcasses can and do have retail value per pound equal to those of lighter weights. But the downward slope (to the right) of retail values as carcass weights increase illustrates the higher probability of a lower retail value associated with heavier carcasses.

Several implications emerge from these computations.

1. Based on these yield values, it appears that a price discount need not be applied uniformly to all carcasses weighing over 55 pounds.

2. On the other hand, if the absence of widespread buying on a yield basis, the practice of discounting heavy carcasses likely will persist since the current probability of a heavy carcass having a lower retail value per pound is much higher.

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[1] Project 1504, Texas Agricultural Experiment Station.

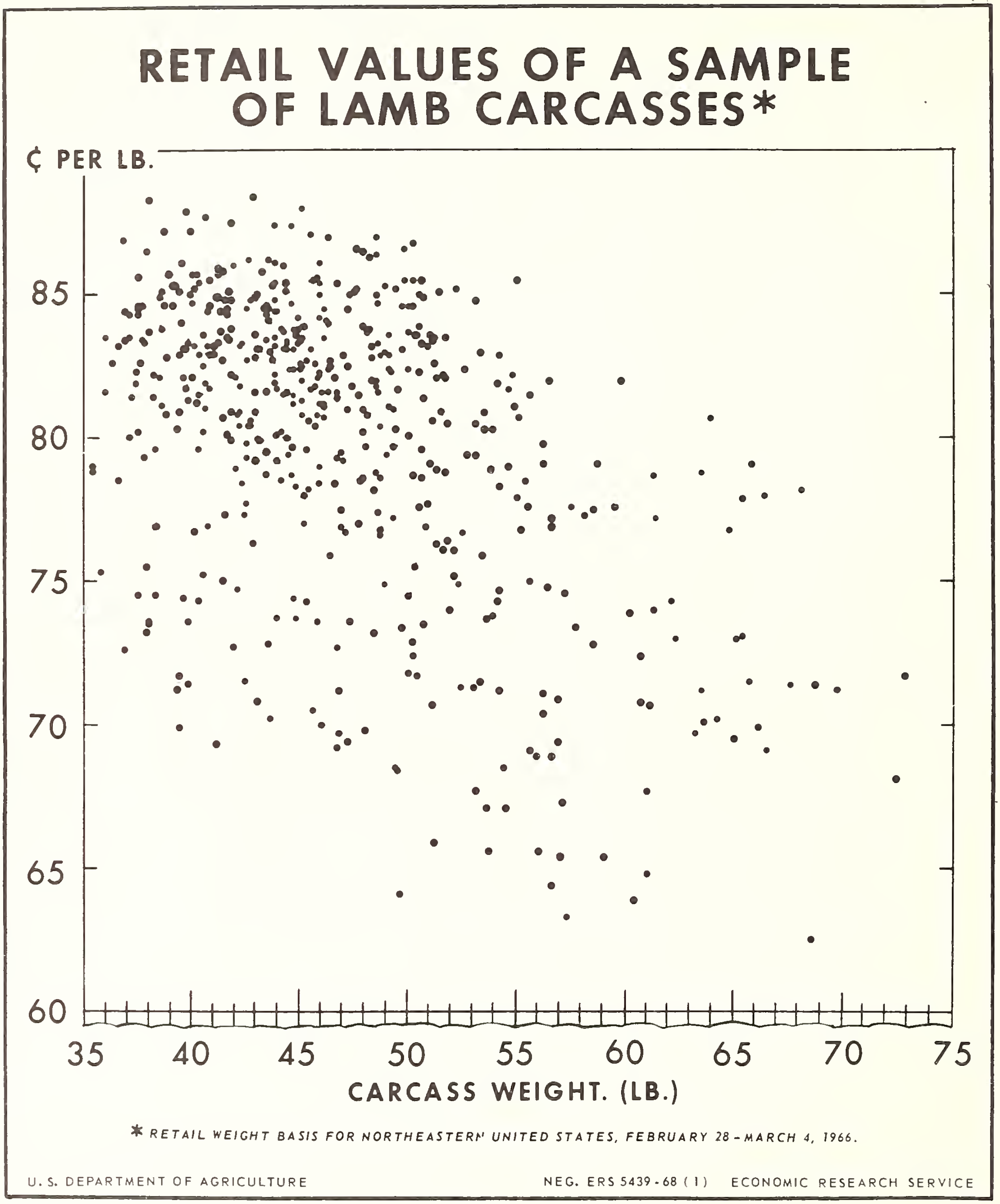
[2] Prices reported by a sample of 40 retail chain divisions for a study of the effect of weekend "specials" on composite retail prices were used.

Table 1.--Average retail values of a sample of Choice & Prime lamb carcasses, 1965-67

Cents/lb. (retail weight basis)

Week of year	1965			1966			1967		
	35-45 lbs.	45-55 lbs.	55 lbs. up	35-45 lbs.	45-55 lbs.	55 lbs. up	35-45 lbs.	45-55 lbs.	55 lbs. up
1	68.40	67.13	61.57	78.84	75.36	68.92	78.16	76.88	70.13
2	69.99	59.99	55.12	76.77	75.29	68.85	76.80	75.35	68.82
3	66.20	64.98	59.51	77.92	76.42	69.90	71.52	70.17	64.27
4	69.56	68.26	62.60	79.05	77.51	70.91	77.52	76.04	69.50
5	68.64	67.36	61.79	80.73	79.18	72.46	77.16	75.68	69.22
6	69.17	67.90	62.28	81.19	79.63	72.86	73.02	71.64	65.53
7	69.58	68.26	62.60	81.56	80.01	73.25	76.02	74.57	68.21
8	69.58	68.26	62.60	81.56	80.01	73.25	72.46	71.05	64.97
9	61.05	59.90	54.98	81.73*	80.17*	73.40*	75.17	73.74	67.41
10	69.56	68.25	62.59	77.77	76.30	69.85	70.49	69.16	63.21
11	69.40	68.09	62.45	81.73	80.17	73.40	73.50	72.11	65.97
12	69.40	68.09	62.45	74.74	73.35	67.04	69.64	68.33	63.53
13	70.56	69.24	63.57	75.45	74.05	67.70	75.40	73.97	67.65
14	70.63	69.32	63.52	80.99	79.47	72.75	71.78	70.39	64.36
15	71.50	70.16	64.31	81.20	79.66	72.93	75.40	73.97	67.65
Average	68.88	67.00	61.46	79.28	77.77	71.16	74.27	72.86	66.63

*See Figure 1.



RETAIL VALUES OF A SAMPLE OF LAMB CARCASSES*

* RETAIL WEIGHT BASIS FOR NORTHEASTERN UNITED STATES, FEBRUARY 28 - MARCH 4, 1966.

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Figure 1

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